NoPig Metal-Loss Detection System
For
Non-Piggable Pipelines
FINO AG
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Numerical calculations of magnetic fields and modeling of the output origins (vertical and horizontal displacements) of the NoPig system were performed using a 2D rotational symmetric software OERSTED. This software solves NoPig problems with an adequate precision if it is dealing with rather long objects like longitudinal seams. Longitudinal seams were successfully modeled and compared with experimental data. The reference defects were modeled for the infinite case in pipes of 3 different diameters: 8", 12" and 16" and 3 different clock positions of defects for 3 different distances between the sensor array and the pipe.

Using this modeling it was found that the pipe wall defects can be retrieved from the data containing offsets coming from long seams after subtraction of averaged displacement curves in the middle ranges of joints. Data from transition ranges between joints should be processed separately using transition curves which can be based either on 3D modeling or on experimental investigations.

A visualization of long seams was implemented in the NoPig program for data evaluation. Thus, the NoPig system is able to detect clock positions of long seams.

Experimental investigations of 8" pipe joints have validated this concept. The NoPig reference defect was retrieved using this approach.

Modifications in the system hardware have dramatically reduced the systematic errors and four group formation. Comparing the data collected from measurements taken in our test facility with the data obtained from 2003 trials confirms this reduction. The current NoPig System allows inspection data obtained from seamless pipes to be evaluated without post-processing the data. Evaluating the calibration data without needing to post-process the data has also been achieved within the reported quarter.

Data collection on the 8" test specimens has been successfully completed. Comparing past calibration and inspection data with the recent collections documents the improvements.

It is imperative to fully understand the transition range around the girth welds. Changing displacements evoked by jumps of long seams clock positions in this area make data processing and defect detection extremely difficult. For this reason, all hardware influences on NoPig were first reduced to a minimum.

Choosing the positioning for the joint's long seams was done in such a fashion that the largest possible difference in offset signals was achieved. This will show just how well the new post-processing functions.

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